

## **Genesis and Damaging Potential of Bow Echo Mesovortices**

*Nolan T. Atkins*

*Lyndon State College, Lyndonville, VT*

Numerical modeling and observational studies have put forth a number of mechanisms describing the genesis of mesovortices within bow echoes. This talk will summarize the different mechanisms discussed in the literature for warm and cold season bow echo events. For warm season events, it will be shown that bow echo mesovortices appear to be generated by the tilting of horizontal vorticity that is generated by the buoyancy difference across the gust front. Cold season mesovortices have been shown to be generated by a shearing instability. However, tilting of streamwise horizontal vorticity along the gust front has yet to be refuted as a possible mechanism.

It is well known that not all mesovortices produce damage. The ability to discriminate between damaging and non damaging mesovortices is an important detection and warning problem. Idealized numerical simulations will be summarized that examine this problem. It will be shown that damaging mesovortices tend to form near the descending rear-inflow jet. Damaging ground-relative winds were created by a linear superposition of system and mesovortex flows on the southern flank of the vortex. Finally, the influence of low-level static stability on mesovortex strength and damaging potential will be discussed.